

What is Claimed Is:

1. A radiant energy transducer system, comprising:  
a radiant energy reflector, having a diffusely reflective area; and  
a transducer associated with the reflector, for transducing between radiant energy reflected from at least a portion of the diffusely reflective area and an electrical signal  
5 corresponding to the reflected radiant energy,  
the reflector comprising:  
a substantially rigid substrate having a surface configured to provide a predetermined shape for the diffusely reflective area; and  
a diffusely reflective coating on the surface of the substrate, the coating comprising:  
10 (a) a zinc-oxide pigment; and  
(b) an alkali metal silicate vehicle-binder.
2. The radiant energy transducer system of claim 1, wherein the coating is characterized by:  
(i) reflectivity  $\geq 95\%$ ; and  
(ii) ability to substantially withstand temperatures up to at least 250° C.
3. The radiant energy transducer system as in claim 1, wherein a ratio of weight of the pigment to weight of the vehicle-binder in the coating is between 1.41 : 1 and 1.15 : 1.
4. The radiant energy transducer system as in claim 3, wherein the ratio of weight of the pigment to weight of the vehicle-binder in the coating is approximately 1.28 : 1.
5. The radiant energy transducer system as in claim 1, wherein the substrate comprises an aluminum or aluminum-alloy.
6. The radiant energy transducer system as in claim 1, wherein the coating has a thickness greater than or equal to 2.75 mils.
7. The radiant energy transducer system as in claim 1, wherein the zinc-oxide pigment comprises at least a substantial proportion of uncalcined zinc-oxide.

8. The radiant energy transducer system as in claim 7, wherein the zinc-oxide pigment further comprises approximately 1/2% by weight of propyonic acid.

9. The radiant energy transducer system as in claim 1, wherein the alkali metal silicate vehicle-binder comprises potassium silicate.

10. The radiant energy transducer system as in claim 1, wherein the transducer comprises a source of radiant energy coupled to emit radiant energy to impact on and reflect from at least a portion of the diffusely reflective area, in response to the electrical signal.

11. The radiant energy transducer system as in claim 10, wherein the source of radiant energy comprises a lamp for emitting visible light.

12. The radiant energy transducer system as in claim 1, wherein the transducer comprises a radiant energy detector coupled to receive radiant energy reflected from at least a portion of the diffusely reflective area, for producing the electrical signal in response to the received radiant energy.

13. The radiant energy transducer system as in claim 12, wherein the radiant energy detector comprises an optical sensor for detecting visible light.

14. The radiant energy transducer system as in claim 1, wherein the radiant energy reflector forms a base, and the diffusely reflective area forms an active area of the base with respect to an intended field of operation, the system further comprising:

5 a mask having a reflective area facing substantially toward the active area of the base, the mask being sized and positioned relative to the base so as to constructively occlude a substantial portion of the active area of the base with respect to the intended field of operation, such that the system exhibits a predetermined performance characteristic over the intended field of operation.

15. The radiant energy transducer system as in claim 1, further comprising:

a base having a reflective active area with respect to an intended field of operation, wherein:

the radiant energy reflector forms a mask, and the diffusely reflective area faces the  
 5 reflective active area of the base,

the mask is sized and positioned relative to the base so as to constructively occlude a  
 substantial portion of the active area of the base with respect to the intended field of operation,  
 such that the system exhibits a predetermined performance characteristic over the intended field  
 of operation.

16. A luminaire, comprising:

a reflector, having a reflective area with a diffusely reflective characteristic with respect  
 to at least a substantial portion of the visible spectrum of light; and

a source of visible light, optically associated with the reflector such that a substantial  
 5 portion of the visible light from the source impacts on and is reflected by the reflective area of  
 the reflector,

the reflector comprising:

a substantially rigid substrate having a surface configured to provide a predetermined  
 shape for the diffusely reflective area; and

10 a diffusely reflective coating on the surface of the substrate, the coating comprising:

- (a) a zinc-oxide pigment; and
- (b) an alkali metal silicate vehicle-binder.

17. The luminaire of claim 16, wherein the coating is characterized by:

- (i) reflectivity  $\geq 95\%$ ; and
- (ii) ability to substantially withstand temperatures up to at least  $250^{\circ}\text{C}$ .

18. The luminaire of claim 16, wherein a ratio of weight of the pigment to weight of  
 the vehicle-binder in the coating is in a range between 1.41:1 and 1.15:1.

19. The luminaire of claim 18, wherein the ratio of weight percent of the pigment to  
 weight percent of the vehicle-binder in the coating is approximately 1.28:1.

20. The luminaire of claim 16, wherein the substrate comprises an aluminum or  
 aluminum-alloy.

21. The luminaire of claim 16, wherein the coating has a thickness greater than or equal to 2.75 mils.

22. The luminaire of claim 16, wherein the zinc-oxide pigment comprises at least a substantial proportion of uncalcined zinc-oxide.

23. The luminaire of claim 22, wherein the zinc oxide pigment further comprises approximately 1/2% by weight of propyonic acid.

24. The luminaire of claim 16, wherein the alkali metal silicate vehicle-binder comprises potassium silicate.

25. The luminaire of claim 16, wherein the reflector forms a base, and the reflective area forms an active area of the base with respect to an intended field of illumination, the luminaire further comprising:

5 a mask having a reflective area facing substantially toward the active area of the base, the mask being sized and positioned relative to the base so as to constructively occlude a substantial portion of the active area of the base with respect to the intended field of illumination, such that the luminaire exhibits a predetermined illumination characteristic over the intended field of illumination.

26. The luminaire of claim 16, further comprising:

a base having a reflective active area with respect to an intended field of illumination, wherein:

5 the reflector forms a mask, and the reflective area of the reflector faces the reflective active area of the base,

the mask is sized and positioned relative to the base so as to constructively occlude a substantial portion of the active area of the base with respect to the intended field of illumination, such that the luminaire exhibits a predetermined illumination characteristic over the intended field of illumination.

27. A reflector for use in a radiant energy transducer system, comprising:

a substantially rigid substrate having a surface configured to provide a predetermined reflector shape; and

a coating on the surface of the substrate, wherein:

5 I) the coating comprises:

(a) a zinc-oxide pigment; and

(b) an alkali metal silicate vehicle-binder; and

II) the coating is characterized by:

(i) reflectivity  $\geq 95\%$ ; and

10 (ii) ability to substantially withstand temperatures up to at least 250° C.

28. The reflector as in claim 27, wherein a ratio of weight of the pigment to weight of the vehicle-binder in the coating is in a range of 1:41:1 to 1:15:1.

29. The reflector as in claim 28, wherein the ratio of weight of the pigment to weight of the vehicle-binder in the coating is approximately 1.28:1.

30. The reflector as in claim 28, wherein the zinc-oxide pigment comprises a substantial proportion of uncalcined zinc-oxide and a relatively small amount of a dispersing agent.

31. The reflector as in claim 30, wherein the dispersing agent comprises propyonic acid, in an amount equal to approximately 1/2% of the binder by weight.

32. The reflector as in claim 27, wherein the alkali metal silicate vehicle-binder consists essentially of potassium silicate.

33. The reflector as in claim 27, wherein the substrate comprises an aluminum or aluminum-alloy.

34. The reflector as in claim 27, wherein the coating has a thickness greater than or equal to 2.75 mils.

35. The reflector as in claim 27, wherein the alkali metal silicate vehicle-binder comprises potassium silicate.

36. A method of manufacturing a reflector for use in a radiant energy transducer system, comprising:

forming a substantially rigid substrate having a surface configured to provide a predetermined reflector shape;

5 mixing an uncalcined zinc-oxide pigment, an alkali metal silicate vehicle-binder and water in a shear mixer, to form a paint mixture;

painting the paint mixture onto the surface of the substrate to form a diffusely reflective coating.

37. The method as in claim 36, wherein the painting step forms the diffusely reflective coating to a thickness greater than or equal to 2.75 mils.

38. The method as in claim 36, wherein the mixing step mixes the uncalcined zinc-oxide pigment, the alkali metal silicate vehicle-binder and the water in the shear mixer having a spindle speed of 1000-2000 rpm for at least approximately three minutes.

39. The method as in claim 36, wherein the mixing step comprises mixing of the uncalcined zinc-oxide pigment and the alkali metal silicate vehicle-binder in a weight ratio in a range between 1.15:1 and 1.41:1.

40. The method as in claim 36, wherein the alkali metal silicate vehicle-binder comprises potassium silicate.

41. The method as in claim 36, wherein the substrate comprises an aluminum or aluminum alloy.

42. The method as in claim 41, further comprising etching the surface of the aluminum or aluminum alloy before the painting step.

43. The method as in claim 36, wherein the pigment contains 1/2% by weight of propyonic acid.

44. A coating material for application to a substrate of a reflector for a radiant energy transducer system, the coating material exhibiting a diffuse reflective characteristic, a

high reflectivity to radiant energy and a high stability when exposed to relatively high temperatures, the coating material comprising:

- 5 (a) a pigment comprising a predominant proportion of uncalcined zinc-oxide;
- (b) an alkali metal silicate vehicle-binder; and
- (c) sufficient water to provide a mixture suitable for application to the substrate of the reflector,

wherein the ratio of weight of the pigment to weight of the vehicle-binder is between  
 10 1:15:1 and 1.41:1.

45. The coating material of claim 44, wherein the alkali metal silicate vehicle-binder consists essentially of potassium silicate.

46. The coating material of claim 44, wherein said ratio is approximately 1.28:1.

47. The coating material of claim 44, wherein the pigment contains 1/2% by weight of propyonic acid.

48. A diffusely reflective water soluble paint, comprising:

- (a) a pigment consisting essentially of uncalcined zinc-oxide pigment and a relatively small amount of dispersing agent;
  - (b) a potassium silicate vehicle-binder; and
  - 5 (c) sufficient water to provide a mixture suitable for application to a substrate,
- wherein the ratio of weight of the pigment to weight of the vehicle binder is between 1.15:1 and 1.41:1.

49. The paint of claim 48, wherein said ratio is approximately 1.28:1.

50. The paint of claim 48, wherein the dispersing agent comprises propyonic acid.

51. A partially transmissive partially reflective article, for use in a radiant energy transducer system, the article comprising:

- a substantially rigid substrate having a surface configured to provide a predetermined shape, the substrate being at least partially transmissive with respect to the radiant energy in at  
 5 least a region underlying said surface; and

a coating on the surface of the substrate, wherein:

I) the coating comprises:

- (a) a zinc-oxide pigment; and
- (b) an alkali metal silicate vehicle-binder; and

10 II) the coating is characterized by:

- (i) a partial reflectivity with respect to the radiant energy; and
- (ii) a partial transmissive character with respect to the radiant energy.

52. The article as in claim 51, wherein  
the substrate is substantially transparent with respect to visible light energy; and  
the coating is of such a thickness on the substrate as to partially reflect and partially  
pass visible light energy.

53. The article as in claim 52, wherein the thickness is approximately 1 mil.

54. The article as in claim 51, wherein the substrate comprises a globe of a light  
bulb.

55. The article as in claim 51, wherein a ratio of weight of the pigment to weight of  
the vehicle-binder in the coating is in a range of 1:41:1 to 1:15:1.

56. The article as in claim 55, wherein the ratio of weight of the pigment to weight  
of the vehicle-binder in the coating is approximately 1.28:1.

57. The article as in claim 51, wherein the zinc-oxide pigment comprises a  
substantial proportion of uncalcined zinc-oxide and a relatively small amount of a dispersing  
agent.

58. The article as in claim 57, wherein the dispersing agent comprises propyonic  
acid, in an amount equal to approximately 1/2% of the binder by weight.

59. The article as in claim 51, wherein the alkali metal silicate vehicle-binder  
consists essentially of potassium silicate.